Space Weather Forecast

Issued on Tuesday 4 February 2025 at 13:06 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of a glancing blow from a coronal mass ejection day 3 (06 Feb). Further Moderate-class flares expected, slight chance of a Strong flare.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was moderate over the past 24 hours, with frequent Moderate-class flares, most of which originated from the complex spot near centre disk. The strongest recorded was an M6.1 flare, peaking at 03/1318 UTC. There are eight active regions on the Earth-facing disc. The majority of the activity is from the broad cluster of sunspots in the north spanning the central disc. These form a rather large and magnetically complex area. There is one notable spot toward the rear of this region which continues to increase in overall areal extent, and has two delta configurations within its intermediate and trailer spots.

An M4.1 flare at 02/2324 UTC was followed by a faint coronal mass ejection from the southeast in imagery. This has been analysed to potentially give a glancing blow at Earth on 06/0700UTC, although this is low confidence.

Solar Wind / Geomagnetic Activity: Solar winds showed a declining connection to coronal hole high speed stream, with speeds around slightly elevated. The Interplanetary Magnetic Field, was initially moderate, but steadily decreased to current weak levels. The north-south component was largely weakly positive. Geomagnetic activity was Quiet (Kp 0-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) persisted at background levels with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Generally Moderate activity is forecast, with Moderate flares expected at times and a slight chance of isolated Strong flares, primarily from the regions in the north spanning centre disc.

Solar Wind / Geomagnetic Activity: A coronal mass ejection associated with a flare late on 02 Feb may give a glancing blow with Earth on the morning of day 3 (06 Feb), although this is low confidence. The potential for further coronal mass ejections is elevated. Earth is still connected to CH11/+, but with wind speeds continuing to decline, likely returning to background levels by day 2 (05 Feb). Solar winds may return to slightly elevated or elevated levels for a time on day 3 (06 Feb), following any potential coronal mass ejection arrival.

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Generally Quiet to Unsettled (Kp 1-3) geomagnetic activity is expected as Earth continues to come out of the coronal hole high speed stream. Following any potential coronal mass ejection arrival on day 3, there is a chance of seeing activity temporarily increase to give a chance of G1-G2/Minor-Moderate Geomagnetic Storm intervals (Kp 5-6).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is likely to remain at background levels. However, there is a slightly increasing risk of a rise through this period as the cluster of sunspots in the north move into the western hemisphere.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	10	40	20
Strong	G3	No	1	1	5	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	Yes	80	80	80	80
Very Active	R3-R5 (X Class)	No	20	20	20	20

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	20	20	25	30
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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